

REMARKS/ARGUMENTS

Claims 1-20 are pending. Claims 1, 13, 15, and 20 have been amended. New claims 16-20 have been added. Support for claims 16-17 can be found in paragraphs [0048]-[0049] of the specification. Support for claims 18-20 can be found in paragraphs [0070]-[0074] of the specification. The specification has been amended to correct minor informalities. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Claims 1, 4-10, and 13-15 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent 6,788,483 to Ferris et al. Claims 10 and 15 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,831,783 to Shinohara. Claims 2-3 and 11-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ferris et al. in view of U.S. Patent 6,188,531 to Chang et al.

Rejection of Claims 1, 4-10, and 13-15 over Ferris et al.

Applicants respectfully submit that independent claim 1 is novel and patentable over Ferris et al. because, for instance, Ferris et al. does not teach or suggest a programmable controller configured to variably set the magnitude of the negative voltage based on information input to the controller.

The controller of Ferris et al. does not use values input to its controller to set the magnitude of the negative voltage, as no information regarding the non-inverted power supply is sent to the controller for modulation and creation of the inverted power supply in the PIVR. The non-inverted voltage is directly sent to the PIVR, with no communication from the controller except for a mode signal 21 that configures the PIVR relative to different modes of operation such as a read mode and a write mode. The programmable portion of the PIVR in Ferris et al. comes from a comparison of the current sense signal 42 to first and second thresholds "programmably configured by the controller relative to the disk drive's mode of operation," as described in column 4, lines 15-18. The programmable aspect of the PIVR thus refers to controlling the mode of operation of the PIVR, not for variably changing the magnitude of the negative/inverted voltage. For at least this reason, claim 1 should be allowable.

Furthermore, the negative voltage is not only generated by the converter, but the magnitude of the negative voltage may be controlled by manipulating settings on the controller, as recited in claim 1. Ferris et al., in contrast, discloses a controller and programmable inverting voltage regulator (PIVR) in column 1, lines 45-48 that being "responsive to the non-inverted voltage supply having a polarity opposite the first polarity, generat[e] an inverted voltage supply having a polarity opposite the first polarity." There is no discussion of variably changing the magnitude of the inverted voltage supply. The inverted voltage supply is simply outputted to the preamplifier to supply voltage to the disk head. As column 4, lines 52-54 state, "[d]uring the time interval t_1 - t_2 , the current in inductor 34 discharges into capacitor 36 to generate the inverted voltage supply 18." This process further continues until "a sufficient amount of current is stored in the capacitor 36 such that the inverted power supply 18 exceeds the threshold established by the resistors 58A and 58B". Thus, no attempt is made in Ferris et al. to variably set the magnitude of the inverted voltage.

For at least the foregoing reasons, claim 1 and claims 4-9 depending therefrom are novel and patentable over Ferris et al.

Applicants respectfully assert that independent claim 10 is novel and patentable over Ferris et al. because, for instance, Ferris et al. does not teach or suggest setting by a controller the magnitude of a negative voltage to be supplied to a drive circuit for the read/write head in accordance with a specified condition based on information input to the controller, the negative voltage being generated from a positive voltage supplied to the drive circuit.

As discussed above, Ferris et al. does not disclose a controller that sets the magnitude of the negative voltage in accordance with a specified condition based on information input to a controller. Accordingly, claim 10 and claims 13-14 depending therefrom are novel and patentable over Ferris et al.

Applicants respectfully assert that independent claim 15 is novel and patentable over Ferris et al. because, for instance, Ferris et al. does not teach or suggest code for setting, in accordance with a specified condition based on information input to a controller, the magnitude

of the negative voltage generated from a supplied positive voltage, the negative voltage to be supplied to a write circuit which drives the read/write head.

As discussed above, Ferris et al. does not disclose setting the magnitude of the negative voltage in accordance with a specified condition based on information input to the controller. Accordingly, claim 15 is novel and patentable over Ferris et al.

Rejection of Claims 10 and 15 over Shinohara

Applicants respectfully submit that independent claim 10 is novel and patentable over Shinohara because, for instance, Shinohara does not teach or suggest setting by a controller the magnitude of a negative voltage to be supplied to a drive circuit for the read/write head in accordance with a specified condition based on information input to the controller, the negative voltage being generated from a positive voltage supplied to the drive circuit.

Shinohara does not even disclose the setting of a magnitude of a negative voltage generated from a supplied positive voltage, as recited in the amended claim. The positive and negative voltages used in Shinohara are generated by using two distinct circuits, instead of receiving a voltage supply from the host and generating an opposite voltage supply within the hard drive. Nothing in Shinohara suggests setting the magnitude of the negative voltage in accordance with a specified condition based on information input to the controller. For at least the foregoing reasons, claim 10 is novel and patentable over Shinohara.

Applicants respectfully assert that independent claim 15 is novel and patentable over Shinohara because, for instance, Shinohara does not teach or suggest code for setting, in accordance with a specified condition based on information input to a controller, the magnitude of the negative voltage generated from a supplied positive voltage, the negative voltage to be supplied to a write circuit which drives the read/write head.

As discussed above, the positive and negative voltages used in Shinohara are generated by using two distinct circuits. The negative voltage is not generated from the positive voltage, and its magnitude is not set in accordance with a specified condition based on information input to a controller. Therefore, claim 15 is novel and patentable over Shinohara.

Rejection of Claims 2, 3, 11, and 12 over Ferris et al. and Chang et al.

Claims 2 and 3 depend from claim 1, and claims 11 and 12 depend from claim 10, and stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ferris et al. in view of Chang et al. The Examiner recognizes that Ferris et al. does not teach that the magnitude of the negative voltage is controlled in accordance with an ambient temperature of the disk, but cites Chang et al. for allegedly disclosing this feature.

Applicants note that Chang et al. does not cure the deficiencies of Ferris et al., in that Chang et al. also fails to teach or suggest a programmable controller configured to variably set the magnitude of the negative voltage based on information input to the controller, as recited in claim 1 from which claims 2 and 3 depend. Chang et al. further fails to teach or suggest setting by a controller the magnitude of a negative voltage to be supplied to a drive circuit for the read/write head in accordance with a specified condition based on information input to the controller, the negative voltage being generated from a positive voltage supplied to the drive circuit, as recited in claim 10 from which claims 11 and 12 depend. Moreover, Ferris et al. does not provide any mechanism to variably set the magnitude of the negative voltage based on information input to a controller.

For at least the foregoing reasons, claims 2, 3, 11, and 12 are patentable over Ferris et al. and Chang et al.

New Claims 16-20

New claims 16-20 depend from claim 1, and recite additional features not taught or suggested in the cited references. More specifically, claim 16 recites that the controller uses stored voltage command information in a register to variably set the magnitude of said negative voltage. Claim 17 recites that the magnitude of said negative voltage is set to a predefined voltage defined by said stored voltage command information. Claim 18 recites that the controller sets the magnitude of said negative voltage in accordance with the average value of said positive voltage. Claim 19 recites, prior to causing the read/write head to perform the seek operation or the write operation: storing values of previous positive and negative voltages;


measuring the value of a supplied positive voltage; and computing the difference between the value of said supplied positive voltage and the value of said previous positive voltage; wherein said specified condition used in setting the magnitude of the negative voltage is the computed difference. Claim 20 recites waiting for a preset period of time to allow the voltage to stabilize after setting the magnitude of the negative voltage before causing the read/write head to perform the seek operation or the write operation. These features are absent from the references.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



Chun-Pok Leung
Reg. No. 41,405

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400
Fax: 415-576-0300
RL:rl
60506671 v1